RESTRICTION REQUIREMENT UNDER 35 U.S.C. §121

Applicants hereby affirm the provisional election made with traverse of Group I, claims 1-10.

In order to properly maintain a restriction requirement under 35 U.S.C. §121, two distinct criteria must be satisfied. Namely, as set forth in MPEP §803, (1) the subjects of the claimed inventions must be shown to be either distinct or independent, and (2) it must be shown that examination of the two separately claimed inventions together in a single application would pose a serious burden to the Examiner. It is submitted that at least the second of these criteria has not been satisfied. In particular, the nature and relationship between the two separately claimed inventions are such that examination together of claims 1-10 and claims 11-20 in a single application would not pose a serious burden to the Examiner. Thus, reconsideration and withdrawal of the restriction requirement is respectfully requested.

CLAIM REJECTIONS UNDER 35 U.S.C. §103(a)

Claims 1-10 stand rejected under 35 U.S.C. §103(a) over U.S. Patent No. 5,863,640 to Ljungberg et al. (hereafter "*Ljungberg et al.*"), or EP 0 753 603 (hereafter "*EP '603*") in view of U.S. Patent No. 5,484,468 to Ostlund et al. (hereafter "*Ostlund et al.*") or WO 98/16665 (hereafter "*WO '665*") on the grounds set forth in paragraph 7 of the Official Action. For at least the reasons noted below, the rejection should be withdrawn.

The present invention is directed to an improved cutting tool insert which exhibits significant improvements with respect to resistance to plastic deformation and toughness behavior. According to the present invention, the above-mentioned improvements are

provided by combining a number of features. For instance, a cutting tool comprising a cemented carbide substrate is provided with a binder phase that is highly alloyed with tungsten, is essentially cubic carbide free, and possesses a binder phase enriched surface zone having a particular thickness and composition. Further, the cemented carbide body is provided with a cutting edge having an optimized binder phase content and cubic carbide composition.

A cutting tool insert formed according to the principles of the present invention exhibits excellent cutting performance when machining steel at high cutting speeds, in particular for low alloyed steels, carbon steels and toughness hardened steels. Additional applications are envisioned. The above-mentioned improved performance characteristics are demonstrated by comparative data appearing on pages 11-17 of the present specification.

A cutting tool insert formed according to the principles of the present invention is set forth in claim 1. Claim 1 recites:

> *1. A cutting tool insert for machining steel, comprising a cemented carbide body and a coating, wherein:*
>
> *the cemented carbide body comprises WC, 2-10 wt.% Co, 4-12 wt.% of cubic carbides of metals from groups 4, 5 or 6 of the periodic table, and N in an amount of between 0.9 and 1.7% of the weight of the elements from groups 4 and 5;*
>
> *the cemented carbide body comprises a Co-binder phase which is highly alloyed with W, and has a CW-ratio of 0.75-0.90;*
>
> *the cemented carbide body has a surface zone with a thickness of <20 μm, which is binder phase enriched and essentially cubic carbide free;*
>
> *the cemented carbide body has a cutting edge which has a binder phase content of 0.65-0.75 by volume of the bulk binder phase content, and the binder phase content increases at a*

constant rate along a line which bisects said cutting edge until it reaches the bulk binder phase content at a distance between 100 and 300 μm from the cutting edge; and

the coating comprises a 3-12 μm columnar TiCN layer followed by a 2-12 μm Al_2O_3 layer.

Even if the above-mentioned four-reference combination were proper, the claimed invention would not result. In fact, the combination of the teachings of the above-mentioned four prior art references teaches away from the presently claimed invention as set forth in claim 1 above.

In particular, none of the above-mentioned prior art references discloses a cemented carbide body which "has a cutting edge which has a binder phase content of 0.65-0.75 by volume of the bulk binder phase content, and the binder phase content increases at a constant rate along a line which bisects said cutting edge until it reaches the bulk binder phase content at a distance between 100 and 300 μm from the cutting edge" as required by claim 1.

Ljungberg et al. discloses a coated cutting insert which includes a "surface zone depleted of cubic carbides and often enriched in binder phase" (column 2, lines 14-15). By contrast, claim 1 requires a cemented carbide body having a cutting edge in which the binder phase content is "0.65-0.75 by volume of the bulk binder phase content." Thus, claim 1 requires that the cutting edge be depleted in binder phase content. By contrast, *Ljungberg et al.* teaches the opposite. Namely, the only surface zone disclosed by *Ljungberg et al.* is enriched in binder phase, therefore, the binder phase content of this surface zone would be greater than 1.0 with respect to the bulk binder phase content.

Ostlund et al. discloses a cemented carbide with a binder phase enriched surface zone having enhanced edge toughness behavior. In this regard, *Ostlund et al.* discloses a binder phase enriched surface zone in which the binder phase content "is greater near the edge than the nominal content of binder in the insert as a whole, decreases away from the edge and cubic phase is present along said line" (emphasis added) (column 2, lines 9-14). Thus, *Ostlund et al.* teaches the opposite of that which is required by claim 1. Namely, claim 1 requires a cemented carbide body having a cutting edge having a binder phase content which is less than the nominal content of binder in the insert as a whole, and which increases at a constant rate along a line which bisects said cutting edge. Therefore, *Ostlund et al.* also teaches away from the presently claimed invention.

WO '665 describes a method of making cemented carbide with a binder phase enriched surface zone. In this regard, *WO '665* discloses that "the binder phase enriched surface zone prevails over the edge" (page 3, lines 11-12). By contrast, claim 1 requires a cemented carbide body having a cutting edge which is depleted in the binder phase. Namely, claim 1 requires a cemented carbide body which has a cutting edge in which the binder phase content is 0.65-0.75 by volume of the bulk binder phase content. Therefore, *WO '665* also teaches away from the present invention as set forth in claim 1.

For at least the reasons set forth above, none of the applied prior art references disclose, or even suggest, a cutting tool insert as defined by claim 1 of the present invention. In fact, *Ljungberg et al.* (and its equivalent *EP '603*), *Ostlund et al.* and *WO '665* each would have led one of ordinary skill in the art away from the cemented carbide body defined in claim 1. Thus, the rejection is improper and should be withdrawn.

CONCLUSION

From the foregoing, further and favorable action in the form of a Notice of Allowance is earnestly solicited. Should the Examiner feel that any issues remain, it is requested that the undersigned be contacted so that any such issues may be adequately addressed.

Respectfully submitted,

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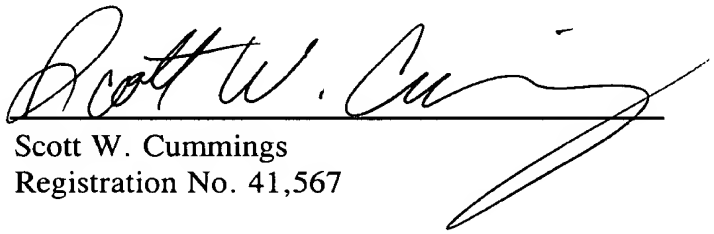
By: 

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